

Jason M. Cope

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Education

Ph.D. Computer Science, University of Colorado at Boulder, August 2009

Dissertation Title: *Data Management for Urgent Computing Environments*

Committee: Henry M. Tufo (chair), Ken Anderson, Pete Beckman, Dan Connors, and Shivakant Mishra

M.S. Computer Science, University of Colorado at Boulder, December 2006

B.S. Computer Engineering, Virginia Polytechnic Institute and State University, May 2003, *Cum Laude*

Research Interests

High-performance computing, scalable systems software, I/O forwarding, system software performance analysis, Grid computing, urgent / emergency computing, scheduling and resource provisioning strategies for Grid and high-performance computing environments, data management in high-performance and Grid computing environments, and modeling HPC and Grid computing environments and workloads

Research and Professional Experience

Postdoctoral Appointee	June 2009–present
Mathematics and Computer Science Division (Rob Ross and Kamil Iskra)	Argonne National Laboratory
I/O Forwarding Scalability Layer (IOFSL) project developer with a focus on tuning and scaling IOFSL for leadership class systems including IBM Blue Gene/P and Cray XT systems. Development and deployment of end-to-end instrumentation and tracing tools for PVFS2.	

Research Staff	January 2010–present
Computation Institute (Rob Ross and Kamil Iskra)	University of Chicago
Development of scalable instrumentation, tracing, and performance analysis tools for HPC applications and I/O software stack components.	

Student Assistant	January 2008–June 2009
Computational and Information Systems Laboratory (Henry M. Tufo)	National Center for Atmospheric Research
Maintain the Coordinated TeraGrid Software and Services (CTSS) for NCAR's Frost IBM Blue Gene/L TeraGrid resource. Develop Grid services to support NCAR's applications and workflows. Represent NCAR for the TeraGrid Software Working Group.	

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Research and Professional Experience (cont.)

Research Assistant
Department of Computer Science
(Henry M. Tufo)

January 2005–June 2009
University of Colorado at Boulder

Develop Grid computing and Web service tools to Grid-enable Earth science applications. Maintain Linux clusters and other high-performance systems. Investigated reusable software development techniques for Grid services. Evaluated several file systems for high-performance computing environments, including the Lustre, GPFS, and PVFS2 file systems. Evaluated 10 Gigabit network infrastructure on a regional network and the TeraGrid.

Research Aide
Mathematics and Computer Science Division
(Pete Beckman)

May 2008–August 2008
Argonne National Laboratory

Evaluated network provisioning strategies for urgent computing workflows using Linux network management tools and the National Lambda Rail's Sherpa / Dynamic VLAN Service. Continued development of a discrete event urgent computing simulator to evaluate data movement and placement workloads.

Givens Associate
Mathematics and Computer Science Division
(Pete Beckman)

May 2007–August 2007
Argonne National Laboratory

Integrated additional resource managers into the Special PRiority and Urgent Computing Environment (SPRUCE) including Cobalt and Condor. Integrated NCAR's Frost Blue Gene/L into SPRUCE. Prototyped quality assurance and monitoring infrastructure for SPRUCE based on Inca2.

Student Visitor
Scientific Computing Division
(Henry M. Tufo)

May 2004–May 2007
National Center for Atmospheric Research

Developed Web services and workflow management tools to support a Grid-enabled biogeochemical modeling environment (Grid-BGC). Integrated NCAR IBM Blue Gene/L system into NSF TeraGrid, including deployment of Grid computing software stack and development of Globus Grid Resource Allocation Management (GRAM) service extensions for the Cobalt resource manager. Represented NCAR for the TeraGrid Software Working Group.

Student Assistant
Department of Computer Science
(Henry M. Tufo)

August 2004– December 2004
University of Colorado at Boulder

Maintained Linux clusters and other high-performance systems. Evaluated several file systems for high-performance computing environments, including the Lustre, GPFS, and PVFS2 file systems.

Application Developer
QSS Group Inc.

May 2003 - August 2003
US Coast Guard Operation Systems Center

Developed application security and accounting tools for the United States Coast Guard's Vessel Documentation System.

Application Developer
QSS Group Inc.

May 2002 - August 2002
US Coast Guard Operation Systems Center

Developed application management tools for the United States Coast Guard's Vessel Documentation System.

Teaching Experience

- Grader, *CSCI 5473: Applied Operating Systems*, University of Colorado at Boulder, Spring 2004.
- Teaching Assistant, *CSCI 4576 / 5576: High-Performance Scientific Computing*, University of Colorado at Boulder, Fall 2007.

Publications

1. K. Ohta, D. Kimpe, J. Cope, K. Iskra, R. Ross, Y. Ishikawa. *Optimization Techniques at the I/O Forwarding Layer*, IEEE International Conference on Cluster Computing 2010; Heraklion, Crete, Greece; Sep. 20, 2010 - Sep. 24, 2010.
2. J. Cope, K. Iskra, D. Kimpe, R. Ross. *Bridging HPC and Grid File I/O with IOFSL*, Para 2010: State of the Art in Scientific and Parallel Computing, Reykjavik, Iceland; Jun. 6, 2010 - Jun. 9, 2010.
3. J. Cope, N. Trebon, H.M. Tufo, and P. Beckman. *Robust Data Placement Heuristics in Urgent Computing Environments*, 18th Heterogeneity in Computing Workshop (HCW 2009), Proceedings of the 23rd International Parallel and Distributed Processing Symposium (IPDPS 2009), Rome, Italy, May, 2009.
4. J. Cope. *Data Management for Urgent Computing Environments*, PhD Thesis. August, 2009.
5. J. Cope, N. Trebon, H.M. Tufo, and P. Beckman. *Robust Data Placement Heuristics in Urgent Computing Environments*, 18th Heterogeneity in Computing Workshop (HCW 2009), Proceedings of the 23rd International Parallel and Distributed Processing Symposium (IPDPS 2009), Rome, Italy, May, 2009.
6. J. Cope and H.M. Tufo. *Supporting Storage Resources in Urgent Computing Environments*, Proceedings of the IEEE International Cluster Conference 2008, Tsukuba, Japan, September, 2008.
7. J. Cope and H.M. Tufo. *Adapting Grid Services for Urgent Computing Environments*, Proceedings of the 3rd International Conference on Software and Data Technologies 2008 (ICSOFD 2008), Porto, Portugal, July, 2008.
8. J. Cope and H.M. Tufo. *A Data Management Framework for Urgent Geoscience Workflows*, Workshop on Geocomputation, Proceedings of the International Conference on Computational Science 2008 (ICCS 2008), Krakow, Poland, June, 2008.
9. J. Cope, M. Oberg, H.M. Tufo, T. Voran, and M. Woitaszek. *High Throughput Grid Computing with an IBM Blue Gene/L*, Proceedings of the IEEE International Cluster Conference 2007, Austin, TX, September, 2007.
10. J. Cope, T. Voran, M. Woitaszek, A. Boggs, S. McCreary, M. Oberg, and H.M. Tufo. *Experiences Deploying a 10 Gigabit Ethernet Computing Environment to Support Regional Computational Science*, Proceedings of the 8th LCI International Conference on Linux Clusters: The HPC Revolution, South Lake Tahoe, CA, May 15th, 2007. (*First Place in Student Paper Competition*).
11. J. Cope, H. M. Tufo, and M. Woitaszek. *An Extensible Service Development Toolkit to Support Earth Science Grids*, proceedings of the 2nd IEEE International Conference on e-Science and Grid Computing, Amsterdam, The Netherlands, December 2006.
12. P. Thornton, H.M. Tufo, N. Wilhelmi, M. Woitaszek, C. Hartsough, J. Cope. *Grid-BGC: a Grid-enabled research platform for high-resolution surface weather interpolation and biogeochemical process modeling*, NASA Earth Science Technology Conference 2006, College Park, MD. June, 2006.
13. A. Boggs, J. Cope, S. McCreary, M. Oberg, H.M. Tufo, T. Voran, and M. Woitaszek, *Improving Cluster Management with Scalable Filesystems*, proceedings of the 7th LCI International Conference on Linux Clusters: The HPC Revolution, Norman, OK, April 2006.

Publications (cont.)

14. J. Cope, C. Hartsough, P. Thornton, H.M. Tufo, N. Wilhelmi, and M. Woitaszek, *Grid-BGC: A Grid-Enabled Terrestrial Carbon Cycle Modeling System*, proceedings of the 11th European Conference on Parallel Processing (Euro-Par), Lisbon, Portugal, August 2005.
15. J. Cope, C. Hartsough, S. McCreary, P. Thornton, H. M. Tufo, N. Wilhelmi, and M. Woitaszek, *Experiences from Simulating the Global Carbon Cycle in a Grid Computing Environment*, Workshop on Grid Applications: from Early Adopters to Mainstream Users (in conjunction with the 14th Global Grid Forum (GGF 14)), Chicago, IL, June 2005.
16. J. Cope, M. Oberg, H.M. Tufo, and M. Woitaszek, *Shared Parallel File Systems in Heterogeneous Linux Multi-Cluster Environments*, proceedings of the 6th LCI International Conference on Linux Clusters: The HPC Revolution, Chapel Hill, NC, April 2005.

Presentations

1. *IOFSL Project Update*, FastOS Birds-of-a-Feather Session, IEEE Supercomputing 2009 (SC 2009), Portland, OR, November 18, 2009.
2. *SPRUCES Data Management Update*, IEEE Supercomputing 2009 (SC 2009), Argonne National Laboratory Booth Presentation, Portland, OR, November 18, 2009.
3. *Robust Data Placement Heuristics in Urgent Computing Environments*, 18th Heterogeneity in Computing Workshop (HCW 2009), held during the 23rd International Parallel and Distributed Processing Symposium (IPDPS 2009), Rome, Italy, May. 2009.
4. *Data Management for Urgent and Emergency Computing Environments*, National Institute for Computational Science Seminar, Oak Ridge National Laboratory, April 15, 2009.
5. *Data Management for Urgent and Emergency Computing Environments*, Mathematics and Computer Science Division Seminar, Argonne National Laboratory, April 7, 2009.
6. *SPRUCES Condor Demo*, IEEE Supercomputing 2008 (SC 2008), Argonne National Laboratory Booth Presentation / Demo, Austin, TX, November 19, 2008.
7. *A Data Management Framework for Urgent Geoscience Applications*, Proceedings of the International Conference on Computational Science 2008 (ICCS 2008), Krakow, Poland, June 25, 2008.
8. *High Throughput Urgent Computing*, Condor Week 2008, Madison, WI, April 30, 2008.
9. *Experiences Deploying a 10 Gigabit Ethernet Computing Environment to Support Regional Computational Science*, the 8th LCI International Conference on Linux Clusters: The HPC Revolution, South Lake Tahoe, CA, May 15, 2007.
10. *Grid-BGC: A Grid-Enabled Terrestrial Carbon Cycle Modeling System*, Unidata Seminar Series, Boulder, CO, January 23, 2006.
11. *Grid-BGC: A Grid-Enabled Terrestrial Carbon Cycle Modeling System*, NCAR CISL Exhibitor Presentations at IEEE Supercomputing 2005 (SC05), Seattle, WA, November 22 and 23, 2005.
12. *Grid-BGC: A Grid-Enabled Terrestrial Carbon Cycle Modeling System*, The 11th European Conference on Parallel Processing (Euro-Par), Lisbon, Portugal, September 2, 2005.
13. *Experiences from Simulating the Global Carbon Cycle in a Grid Computing Environment*, Workshop on Grid Applications: from Early Adopters to Mainstream Users (in conjunction with the 14th Global Grid Forum (GGF 14)), Chicago, IL, June 27, 2005.
14. *Grid-BGC: A Grid-Enabled Terrestrial Carbon Cycle Modeling System*, GlobusWORLD 2005, Boston, MA, February 10, 2005.

Posters

1. *Supporting Storage Resources in Urgent Computing Environments*, The IEEE International Cluster Conference 2008, Tsukuba, Japan, September 30, 2008.
2. *An Extensible Service Development Toolkit to Support Earth Science Grids*, The 2nd IEEE International Conference on e-Science and Grid Computing, Amsterdam, The Netherlands, December 5, 2006.
3. *Grid-BGC: A Grid-Enabled Terrestrial Carbon Cycle Modeling System*, TeraGrid 2006 Conference: Advancing Scientific Discovery, Indianapolis, IN, June 14, 2006.

Tutorials

Service-Oriented Computing for HPC Data Centers and Grids, 9th LCI International Conference on High-Performance Clustered Computing, Urbana, IL, April 28, 2008 (1/2 day).

Professional Service

Reviewer, IEEE Transactions on Parallel and Distributed Systems, Special Issue on Many Task Computing, January 2010.

Student Volunteer, TeraGrid 2006 Conference: Advancing Scientific Discovery, Indianapolis, IN, June 12 - 15, 2006.

Community Service

Volunteer, 2010 Ride for Autism Speaks Chicago (September 2010)

Volunteer, Autism Speaks Heroes Ball (November 2010)

Volunteer, Chicago Auto Show First Look for Charity (February 2011)

Community Outreach Committee Member, Autism Speaks to Young Professionals (January 2011 - present)

Awards and Honors

- University of Colorado Department of Computer Science's Departmental Travel Award for presentation of paper / poster at IEEE Cluster 2008, Fall 2008.
- University of Colorado Department of Computer Science's Departmental Travel Award for presentation of paper at ICCS 2008, Fall 2008.
- First Place in Student Paper Competition, The 8th LCI International Conference on Linux Clusters: The HPC Revolution, for *Experiences Deploying a 10 Gigabit Ethernet Computing Environment to Support Regional Computational Science*, May 2007.
- University of Colorado Department of Computer Science's Clive Fraser Baillie Memorial Travel Award, Fall 2006.
- IEEE Scalable Computing Society Travel Award, Fall 2006.
- University of Colorado Department of Computer Science's Clive Fraser Baillie Memorial Travel Award, Fall 2005.
- Eagle Scout, Boy Scouts of America, 1998.

Skills

Languages: English (native), German (novice)

Computer Skills: C, C++, Perl, Python, Java, bash, autotools (autoconf and automake), Linux system administration, Linux kernel and application development, \LaTeX , Globus Toolkit v3.2 and 4.0 administration and development, Web services development (WSDL, WSRF), MPI, OpenMP, database administration and application development (PostgreSQL, MySQL), Matlab, Condor, PBS / Torque / Maui, Cobalt